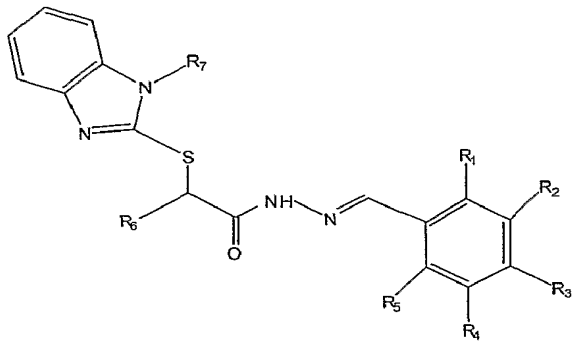
**Amendments to the Claims**

The following listing of claims will replace all prior versions, and listings, of claims in the subject application:

1-42. (Cancelled).

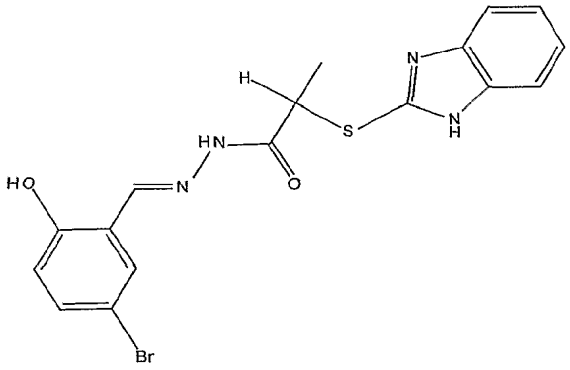
43. (Withdrawn) A method of treating a disorder mediated by a soluble adenylyl cyclase of a

subject, said method comprising:
administering to the subject a therapeutically effective amount of a compound that modulates the soluble adenylyl cyclase, said compound having the following formula:

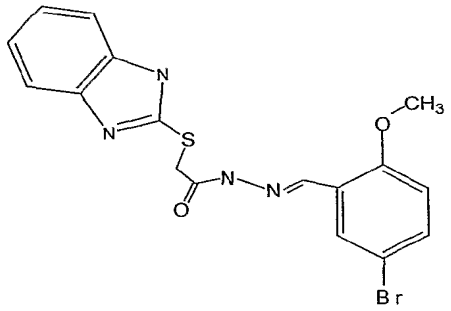



wherein:
$R_1$ is H, OH, alkyloxy, or halogen;
$R_2$ and $R_5$ are H or halogen;
$R_3$ is H or OH;
$R_4$ is H, alkyloxy, or halogen;
$R_6$ is H or alkyl; and
$R_7$ is H or $CH_2R_8$, wherein $R_8$ is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of $R_1$, $R_2$, and $R_4$ is a halogen.

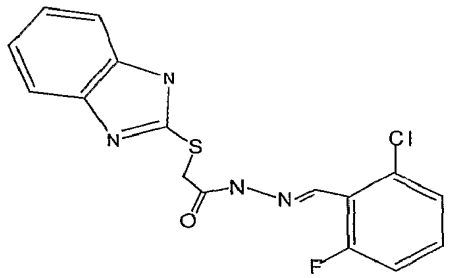
44. (Withdrawn) The method according to claim 43, wherein the compound is selected from the group consisting of compounds having the following formulas:


H
N
S
N
H
HN
O
HO
N
Br

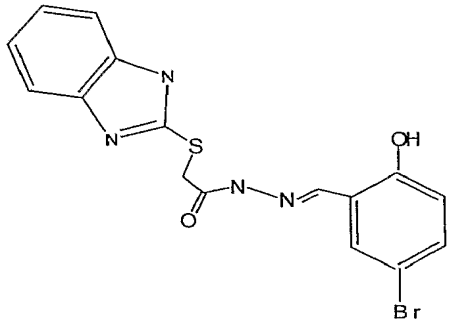
,


N
N
S
O
N
N
O
CH3
Br

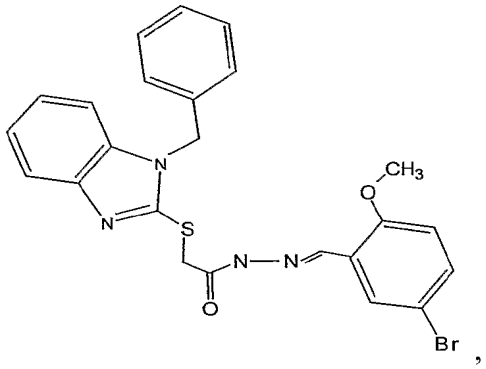
,


N
N
S
O
N
N
Cl
F

,


N
N
S
O
N
N
OH
Br

,



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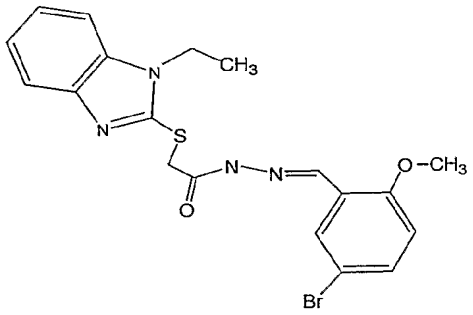

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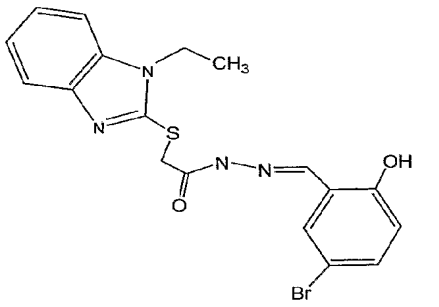

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45. (Withdrawn) The method according to claim 43, wherein the subject is an eukaryotic organism.

46. (Withdrawn) The method according to claim 45, wherein the eukaryotic organism is a mammal.

47. (Withdrawn) The method according to claim 46, wherein the mammal is a human.

48. (Withdrawn) The method according to claim 47, wherein the disorder is selected from the group consisting of: learning or memory disorders, male fertility/sterility, glaucoma, metabolic acidosis/alkalosis, metabolic disorders, diabetes, breathing

disorders, insulin resistance, hyperinsulinemia, spinal cord injury, Alzheimer's disease, amyotrophic lateral sclerosis, and peripheral neuropathy.

49. (Withdrawn) The method according to claim 48, wherein the disorder is a learning or memory disorder.

50. (Withdrawn) The method according to claim 48, wherein the disorder is metabolic acidosis/alkalosis.

51. (Withdrawn) The method according to claim 48, wherein the disorder is diabetes.

52. (Withdrawn) The method according to claim 48, wherein the disorder is a metabolic disorder.

53. (Withdrawn) The method according to claim 48, wherein the disorder is insulin resistance.

54. (Withdrawn) The method according to claim 48, wherein the disorder is hyperinsulinemia.

55. (Withdrawn) The method according to claim 48, wherein the disorder is spinal cord injury.

56. (Withdrawn) The method according to claim 48, wherein the disorder is Alzheimer's disease.

57. (Withdrawn) The method according to claim 48, wherein the disorder is amyotrophic lateral sclerosis.

58. (Withdrawn) The method according to claim 48, wherein the disorder is peripheral neuropathy.

59. (Withdrawn) The method according to claim 43, further comprising identifying the subject suffering from a disorder mediated by a soluble adenylyl cyclase before administering to the subject a therapeutically effective amount of a compound that modulates the soluble adenylyl cyclase.

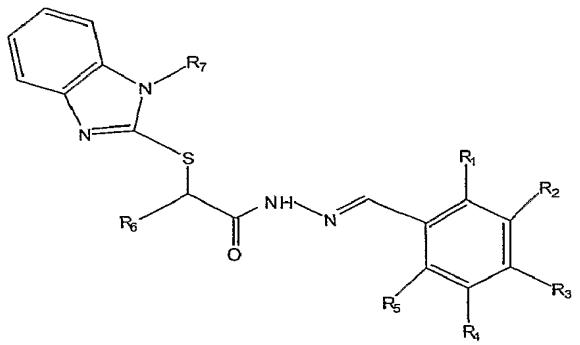
60. (Withdrawn) A method of treating a disorder mediated by a soluble adenylyl cyclase of a subject, wherein the disorder is selected from the group consisting of: learning or memory disorders, spinal cord injury, Alzheimer's disease, amyotrophic lateral sclerosis, and peripheral neuropathy, said method comprising:
modulating the soluble adenylyl cyclase of the subject.

61. (Withdrawn) The method according to claim 60, wherein the subject is an eukaryotic organism.

62. (Withdrawn) The method according to claim 61, wherein the eukaryotic organism is a mammal.

63. (Withdrawn) The method according to claim 62, wherein the mammal is a human.

64. (Withdrawn) A pharmaceutical composition for treating a disorder mediated by a soluble adenylyl cyclase of a subject, comprising a therapeutically effective amount of a compound of the following formula:




wherein:
$R_1$ is H, OH, alkyloxy, or halogen;
$R_2$ and $R_5$ are H or halogen;

$R_3$ is H or OH;

$R_4$ is H, alkyloxy, or halogen;

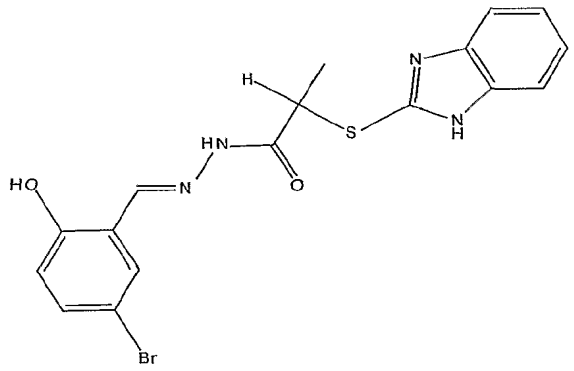
$R_6$ is H or alkyl; and

$R_7$ is H or $CH_2R_8$, wherein $R_8$ is H, alkyl, or substituted or unsubstituted phenyl,

with the proviso that at least one of $R_1$, $R_2$, and $R_4$ is a halogen,

and one or more pharmaceutically acceptable excipients.

65. (Withdrawn) The pharmaceutical composition of claim 64, wherein the compound is selected from the group consisting of compounds having the following formulas:

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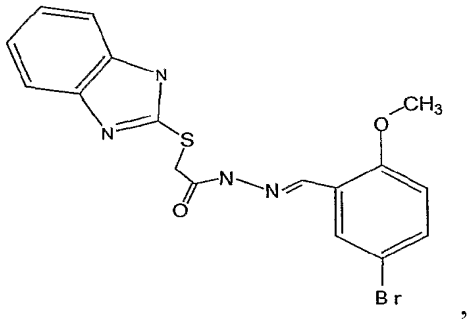


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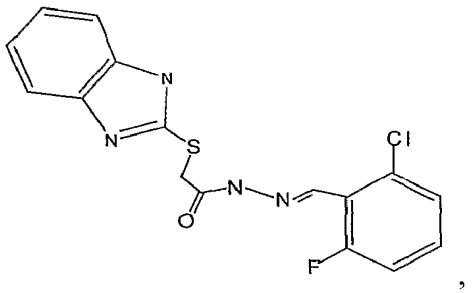


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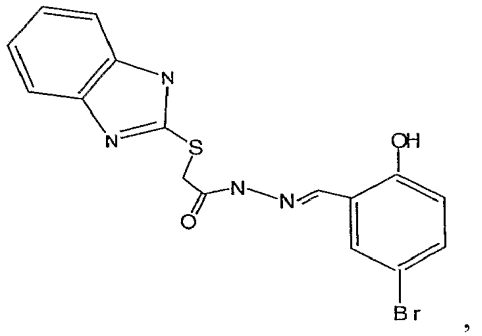

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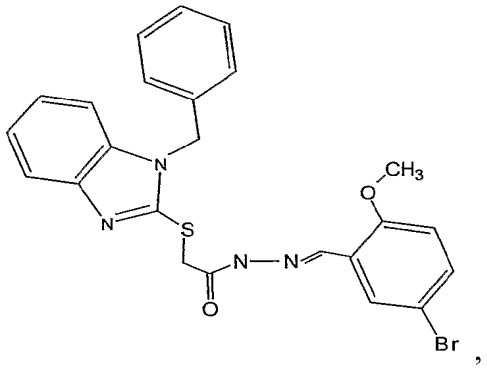

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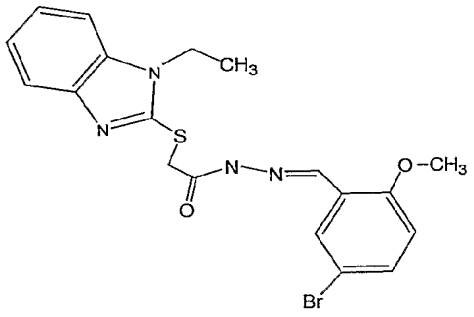
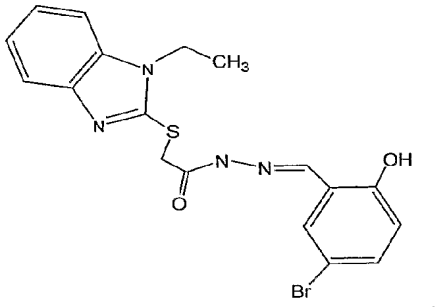


, and



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66. (Withdrawn) The pharmaceutical composition of claim 64, wherein the subject is an eukaryotic organism.

67. (Withdrawn) The pharmaceutical composition of claim 66, wherein the eukaryotic organism is a mammal.

68. (Withdrawn) The pharmaceutical composition of claim 67, wherein the mammal is a human.

69. (Withdrawn) The pharmaceutical composition of claim 68, wherein the human disorder is selected from the group consisting of: learning or memory disorders, male fertility/sterility, glaucoma, metabolic acidosis/alkalosis, diabetes, metabolic disorders, breathing disorders, insulin resistance, hyperinsulinemia, spinal cord injury, Alzheimer's disease, amyotrophic lateral sclerosis, and peripheral neuropathy.

70. (Withdrawn) A method of treating a parasitic infection in a subject, the method comprising: administering to the subject a therapeutically effective amount of a compound that inhibits adenylyl cyclase of the parasite.

71. (Withdrawn) The method of claim 70, wherein the parasitic infection is malaria.

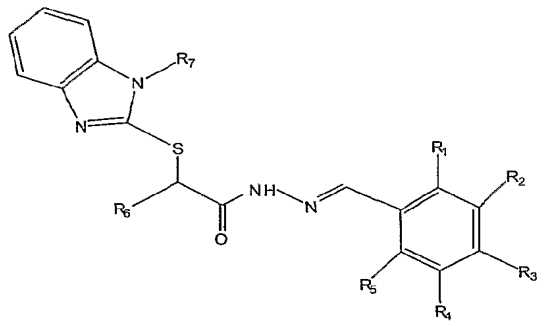
72. (Withdrawn) The method of claim 70, wherein the compound does not substantially inhibit adenylyl cyclase of the subject.

73. (Withdrawn) The method of claim 72, wherein the subject is an eukaryotic organism.

74. (Withdrawn) The method of claim 73, wherein the eukaryotic organism is a mammal.

75. (Withdrawn) The method of claim 74, wherein the mammal is human.

76. (Withdrawn) The method of claim 70, wherein the compound has the following formula:



wherein:

$R_1$ is H, OH, alkyloxy, or halogen;

$R_2$ and $R_5$ are H or halogen;

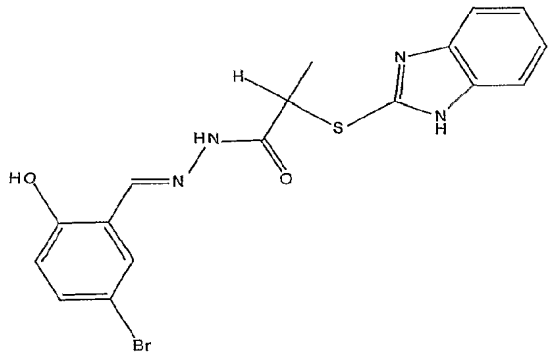
$R_3$ is H or OH;

$R_4$ is H, alkyloxy, or halogen;

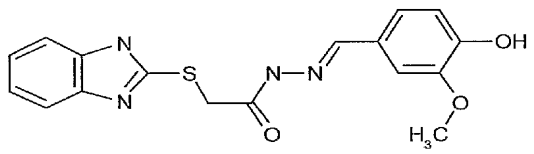
$R_6$ is H or alkyl; and

$R_7$ is H or $CH_2R_8$, wherein $R_8$ is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of $R_1$, $R_2$, and $R_4$ is a halogen.

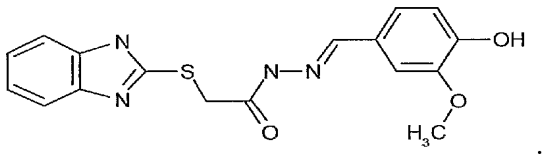
77. (Withdrawn) The method of claim 76, wherein the compound has the following formula:



78. (Withdrawn) The method of claim 76, wherein the compound has the following formula:



79. (Withdrawn) The method of claim 75, wherein the compound has the following formula:




80. (Withdrawn) The method of claim 76, wherein $R_1$ is H, $R_3$ is H, $R_4$ is H, $R_6$ is H, and $R_7$ is H.

81. (Withdrawn) The method of claim 80, wherein $R_2$ is halogen and $R_5$ is H.

82. (Withdrawn) The method of claim 81 , wherein $R_2$ is chlorine.

83. (Withdrawn) The method of claim 80, wherein $R_2$ is halogen and $R_5$ is halogen.

84. (Withdrawn) The method of claim 83, wherein $R_2$ is bromine and $R_5$ is fluorine.

85. (Withdrawn) The method of claim 70, wherein the adenylyl cyclase of the parasite is responsive to bicarbonate.

86. (Withdrawn) The method of claim 70, wherein the adenylyl cyclase of the parasite is responsive to carbon dioxide.

87. (Withdrawn) The method of claim 70, further comprising identifying a subject infected or likely to be infected with the parasite before administering to the subject a therapeutically effective amount of a compound that inhibits adenylyl cyclase of the parasite.

88. (Withdrawn) A method of treating a fungal infection in a subject, the method comprising: administering to the subject a therapeutically effective amount of a compound that inhibits adenylyl cyclase of the fungal organism.

89. (Withdrawn) The method of claim 88, wherein the fungal organism is C. albicans.

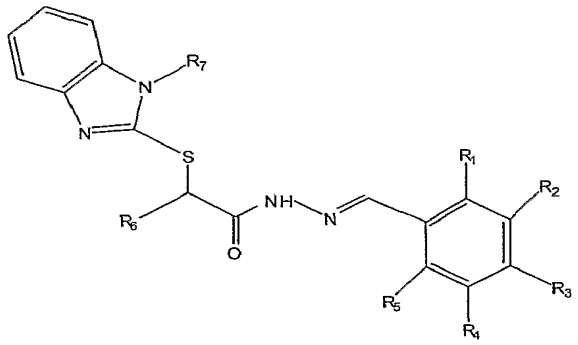
90. (Withdrawn) The method of claim 88, wherein the compound does not substantially inhibit adenylyl cyclase of the subject.

91. (Withdrawn) The method of claim 90, wherein the subject is an eukaryotic organism.

92. (Withdrawn) The method of claim 91, wherein the eukaryotic organism is a mammal.

93. (Withdrawn) The method of claim 92, wherein the mammal is human.

94. (Withdrawn) The method of claim 88, wherein the compound has the following formula:




wherein:

$R_1$ is H, OH, alkyloxy, or halogen;

$R_2$ and $R_5$ are H or halogen;

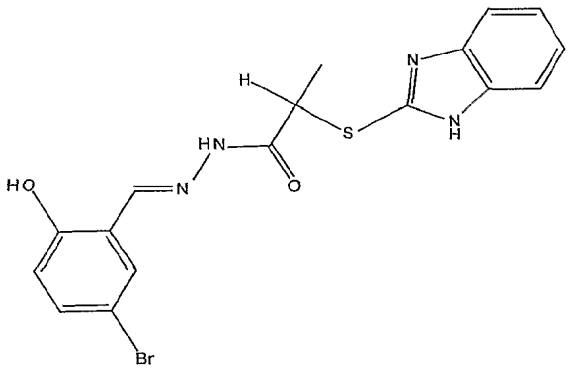
$R_3$ is H or OH;

$R_4$ is H, alkyloxy, or halogen;

$R_6$ is H or alkyl; and

$R_7$ is H or $CH_2R_8$, wherein $R_8$ is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of $R_1$, $R_2$, and $R_4$ is a halogen.

95. (Withdrawn) The method of claim 94, wherein the compound has the following formula:




96. (Withdrawn) The method of claim 88, wherein the adenylyl cyclase of the fungal organism is responsive to bicarbonate.

97. (Withdrawn) The method of claim 88, wherein the adenylyl cyclase of the fungal organism is responsive to carbon dioxide.

98. (Withdrawn) The method of claim 70, further comprising identifying a subject infected or likely to be infected with the fungal organism before administering to the subject a therapeutically effective amount of a compound that inhibits adenylyl cyclase of the fungal organism.

99. (Withdrawn) A pharmaceutical composition for treating a parasitic infection in a subject comprising:
a therapeutically effective amount of a compound that inhibits adenylyl cyclase of the parasite; and
a pharmaceutically acceptable carrier.

100. (Withdrawn) The pharmaceutical composition of claim 99, wherein the parasitic infection is malaria.

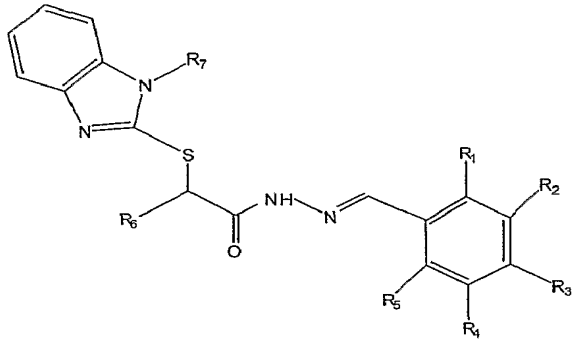
101. (Withdrawn) The pharmaceutical composition of claim 99, wherein the compound does not substantially inhibit adenylyl cyclase of the subject.

102. (Withdrawn) The pharmaceutical composition of claim 101, wherein the subject is an eukaryotic organism.

103. (Withdrawn) The pharamaceutical composition of claim 102, wherein the eukaryotic organism is a mammal.

104. (Withdrawn) The pharmaceutical composition of claim 103, wherein the mammal is human.

105. (Withdrawn) The pharmaceutical composition of claim 99, wherein compound has the following formula:




wherein:

$R_1$ is H, OH, alkyloxy, or halogen;

$R_2$ and $R_5$ are H or halogen;

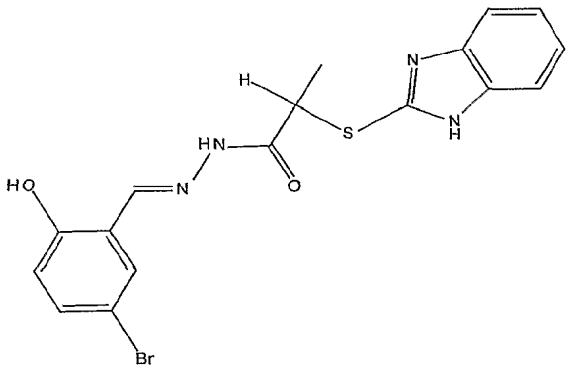
$R_3$ is H or OH;

$R_4$ is H, alkyloxy, or halogen;

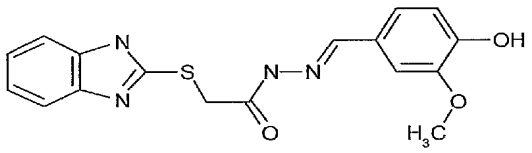
$R_6$ is H or alkyl; and

$R_7$ is H or $CH_2R_8$, wherein $R_8$ is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of $R_1$, $R_2$, and $R_4$ is a halogen.

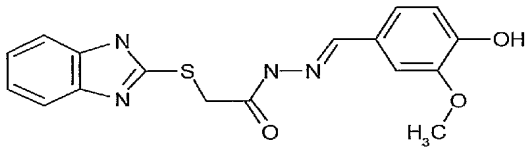
106. (Withdrawn) The pharmaceutical composition of claim 105, wherein the compound has the following formula:



107. (Withdrawn) The pharmaceutical composition of claim 105, wherein the compound has the following formula:



108. (Withdrawn) The pharmaceutical composition of claim 104, wherein the compound has the following formula:



109. (Withdrawn) The pharmaceutical composition of claim 105, wherein $R_1$ is H, $R_3$ is H, $R_4$ is H, $R_6$ is H, and $R_7$ is H.

110. (Withdrawn) The pharmaceutical composition of claim 109, wherein $R_2$ is halogen and $R_5$ is H.

111. (Withdrawn) The pharmaceutical composition of claim 110, wherein $R_2$ is chlorine.

112. (Withdrawn) The pharmaceutical composition of claim 109, wherein $R_2$ is halogen and $R_5$ is halogen.

113. (Withdrawn) The pharmaceutical composition of claim 112, wherein $R_2$ is bromine and $R_5$ is fluorine.

114. (Withdrawn) The pharmaceutical composition of claim 99, wherein the pharmaceutical composition is for oral or parenteral administration.

115. (Cancelled).

116. (Cancelled).

117. (Withdrawn) A pharmaceutical composition for treating a fungal infection in a subject comprising, an effective amount of a compound that inhibits adenylyl cyclase of the fungal organism; and
a pharmaceutically acceptable carrier.

118. (Withdrawn) The pharmaceutical composition of claim 117, wherein the fungal organism is C. albicans.

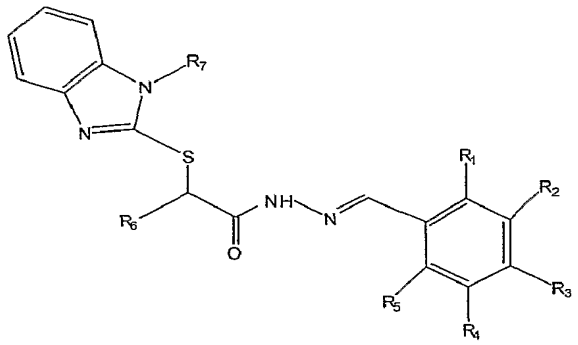
119. (Withdrawn) The pharmaceutical composition of claim 117, wherein the compound does not substantially inhibit the adenylyl cyclase of the subject.

120. (Withdrawn) The pharmaceutical composition of claim 119, wherein the subject is an eukaryotic organism.

121. (Withdrawn) The pharmaceutical composition of claim 120, wherein the eukaryotic organism is a mammal.

122. (Withdrawn) The pharmaceutical composition of claim 121, wherein the mammal is human.

123. (Withdrawn) The pharmaceutical composition of claim 117, wherein the compound has the following formula:



wherein:

$R_1$ is H, OH, alkyloxy, or halogen;

$R_2$ and $R_5$ are H or halogen;

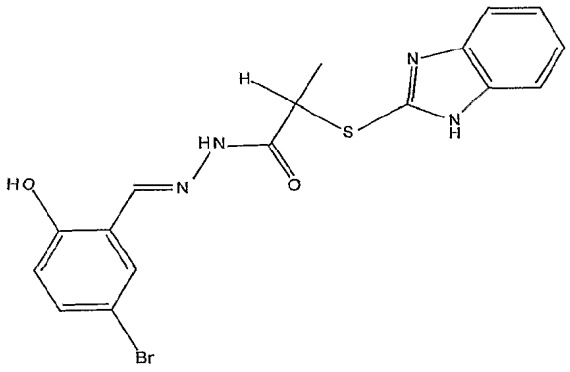
$R_3$ is H or OH;

$R_4$ is H, alkyloxy, or halogen;

$R_6$ is H or alkyl; and

$R_7$ is H or $CH_2R_8$, wherein $R_8$ is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of $R_1$, $R_2$, and $R_4$ is a halogen.

124. (Withdrawn) The pharmaceutical composition of claim 122, wherein the compound has the following formula:



125. (Withdrawn) The pharmaceutical composition of claim 117, wherein the pharmaceutical composition is for oral or parenteral administration.

126. (Cancelled).

127. (Cancelled).

128. (Withdrawn) A method of treating a parasitic infection in a subject mediated by adenylyl cyclase of a parasite in a subject, comprising, inhibiting the adenylyl cyclase of the parasite.

129. (Withdrawn) The method of claim 128, wherein the parasitic infection is malaria.

130. (Withdrawn) The method of claim 128, wherein inhibiting adenylyl cyclase of the parasite does not substantially inhibit adenylyl cyclase of the subject.

131. (Withdrawn) The method of claim 130, wherein the subject is an eukaryotic organism.

132. (Withdrawn) The method of claim 131, wherein the eukaryotic organism is a mammal.

133. (Withdrawn) The method of claim 132, wherein the mammal is human.

134. (Withdrawn) The method of claim 128, wherein the adenylyl cyclase of the parasite is responsive to bicarbonate.

135. (Withdrawn) The method of claim 128, wherein the adenylyl cyclase of the parasite is responsive to carbon dioxide.

136. (Withdrawn) A method of treating a fungal infection in a subject mediated by adenylyl cyclase of the fungal organism in a subject, comprising:
inhibiting adenylyl cyclase of the fungal organism.

137. (Withdrawn) The method of claim 136, wherein the fungal infection is C. albicans.

138. (Withdrawn) The method of claim 136, wherein inhibiting adenylyl cyclase of the fungal organism does not substantially inhibit adenylyl cyclase of the subject.

139. (Withdrawn) The method of claim 138, wherein the subject is an eukaryotic organism.

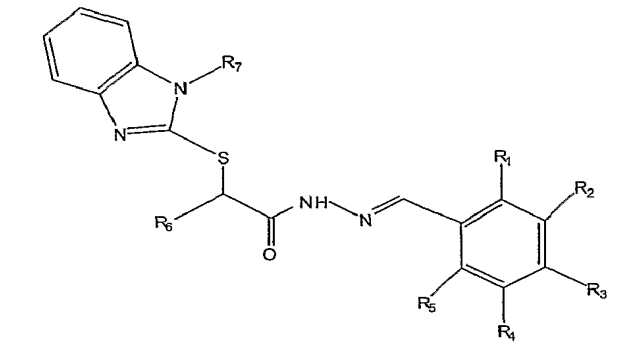
140. (Withdrawn) The method of claim 139, wherein the eukaryotic organism is a mammal.

141. (Withdrawn) The method of claim 140, wherein the mammal is human.

142-151. (Cancelled).

152. (Currently Amended) A method of inhibiting adenylyl cyclase of a parasite, the method comprising:

contacting a eukaryotic cell with a compound that specifically inhibits adenylyl cyclase of a parasite, said compound having the following formula:




wherein:

$R_1$ is H, OH, alkyloxy, or halogen;

$R_2$ and $R_5$ are H or halogen;

$R_3$ is H or OH;

$R_4$ is H, alkyloxy, or halogen;

$R_6$ is H or alkyl; and

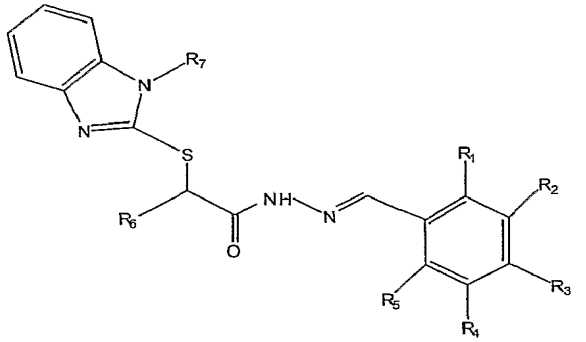
$R_7$ is H or $CH_2R_8$, wherein $R_8$ is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of $R_1$, $R_2$, and $R_4$ is a halogen.

153. (Previously Presented) The method of claim 152, wherein the eukaryotic cell is infected with the parasite.

154. (Previously Presented) The method of claim 153, wherein the eukaryotic cell is a mammalian cell.

155. (Previously Presented) The method of claim 154, wherein the mammalian cell is a human cell.

156. (Currently Amended) A method of inhibiting adenylyl cyclase of a fungal organism, the method comprising:
contacting a eukaryotic cell with a compound that specifically inhibits adenylyl cyclase of a fungal organism, said compound having the following formula:



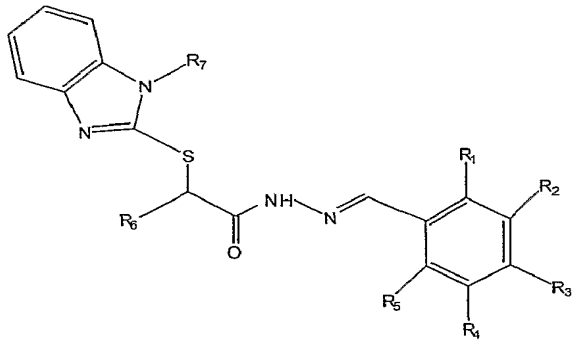

wherein:
$R_1$ is H, OH, alkyloxy, or halogen;
$R_2$ and $R_5$ are H or halogen;
$R_3$ is H or OH;
$R_4$ is H, alkyloxy, or halogen;
$R_6$ is H or alkyl; and
$R_7$ is H or $CH_2R_8$, wherein $R_8$ is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of $R_1$, $R_2$, and $R_4$ is a halogen.

157. (Previously Presented) The method of claim 156, wherein the cell is infected with the fungal organism.

158. (Previously Presented) The method of claim 157, wherein the eukaryotic cell is a mammalian cell.

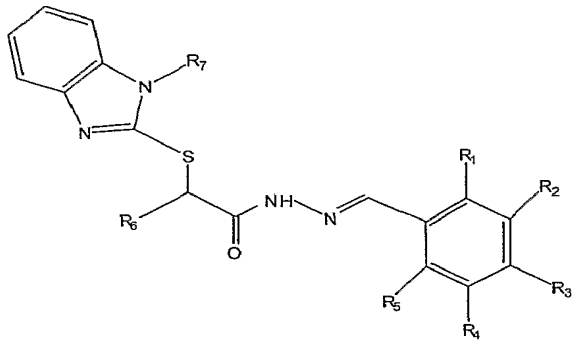
159. (Previously Presented) The method of claim 158, wherein the mammalian cell is a human cell.

160. (Currently Amended) A method of inhibiting adenylyl cyclase of a parasite, the method comprising:
contacting a parasite with a compound that specifically inhibits adenylyl cyclase of the parasite, said compound having the following formula:




wherein:
$R_1$ is H, OH, alkyloxy, or halogen;
$R_2$ and $R_5$ are H or halogen;
$R_3$ is H or OH;
$R_4$ is H, alkyloxy, or halogen;
$R_6$ is H or alkyl; and
$R_7$ is H or $CH_2R_8$, wherein $R_8$ is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of $R_1$, $R_2$, and $R_4$ is a halogen.

161. (Currently Amended) A method of inhibiting adenylyl cyclase of a fungal organism, the method comprising:
contacting a fungal organism with a compound that specifically inhibits adenylyl cyclase of the fungal organism, said compound having the following formula:



wherein:

$R_1$ is H, OH, alkyloxy, or halogen;

$R_2$ and $R_5$ are H or halogen;

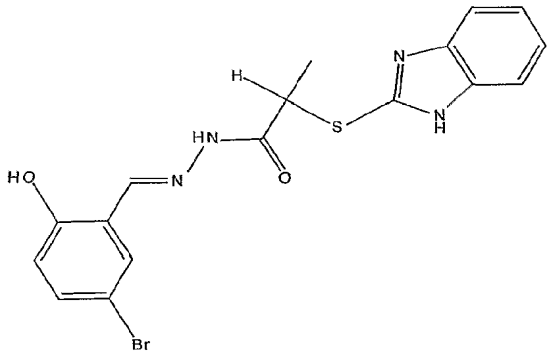
$R_3$ is H or OH;

$R_4$ is H, alkyloxy, or halogen;

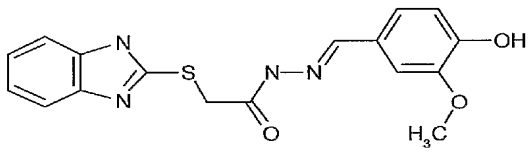
$R_6$ is H or alkyl; and

$R_7$ is H or $CH_2R_8$, wherein $R_8$ is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of $R_1$, $R_2$, and $R_4$ is a halogen

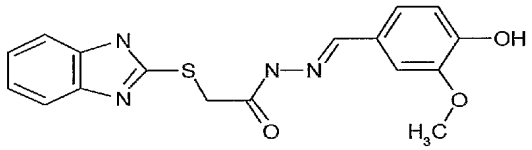
162. (New) The method according to claim 152, wherein the compound has the following formula:



163. (New) The method of claim 152, wherein the compound has the following formula:



164. (New) The method of claim 152, wherein the compound has the following formula:



165. (New) The method of claim 152, wherein $R_1$ is H, $R_3$ is H, $R_4$ is H, $R_6$ is H, and $R_7$ is H.

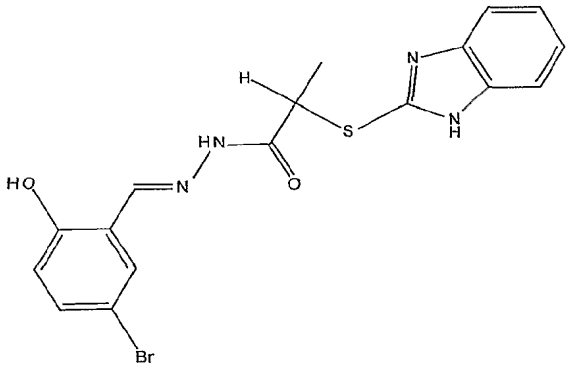
166. (New) The method of claim 165, wherein $R_2$ is halogen and $R_5$ is H.

167. (New) The method of claim 166, wherein $R_2$ is chlorine.

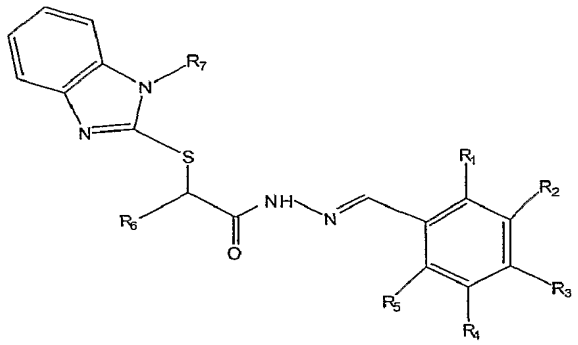
168. (New) The method of claim 165, wherein $R_2$ is halogen and $R_5$ is halogen.

169. (New) The method of claim 168, wherein $R_2$ is bromine and $R_5$ is fluorine.

170. (New) The method of claim 156, wherein the compound has the following formula:



171. (New) A method of modulating activity of a soluble adenylyl cyclase comprising: contacting an eukaryotic cell with a compound that modulates the activity of the soluble adenylyl cyclase, said compound having the following formula:



wherein:

$R_1$ is H, OH, alkyloxy, or halogen;

$R_2$ and $R_5$ are H or halogen;

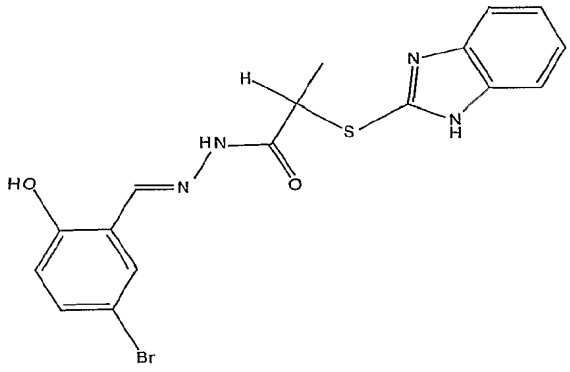
$R_3$ is H or OH;

$R_4$ is H, alkyloxy, or halogen;

$R_6$ is H or alkyl; and

$R_7$ is H or $CH_2R_8$, wherein $R_8$ is H, alkyl, or substituted or unsubstituted phenyl, with the proviso that at least one of $R_1$, $R_2$, and $R_4$ is a halogen.

172. (New) The method according to claim 171, wherein the compound is selected from the group consisting of compounds having the following formulas:



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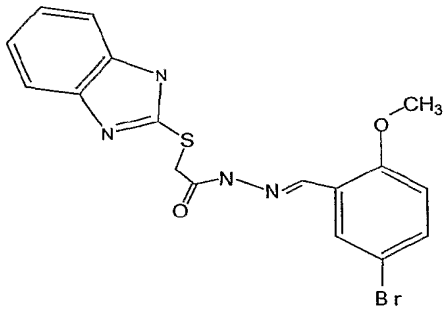

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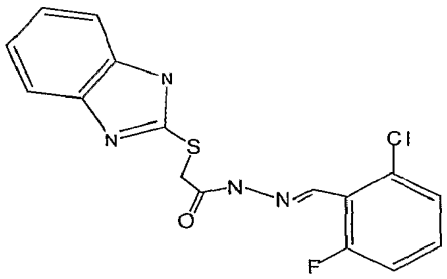


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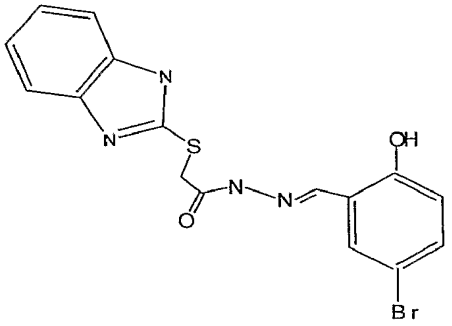


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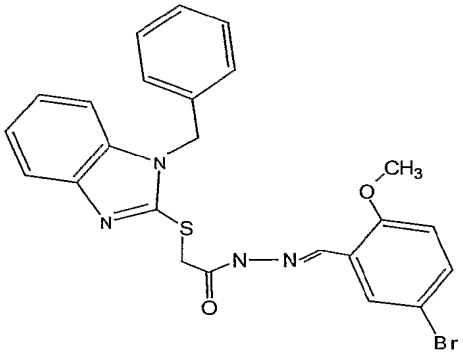


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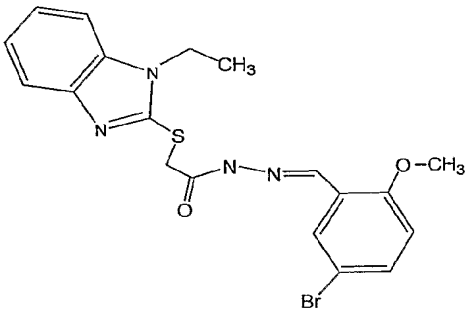


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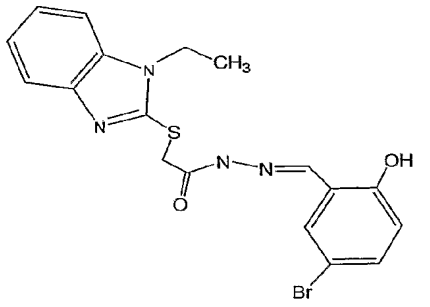


173. (New) The method according to claim 171, wherein modulating the activity of the soluble adenylyl cyclase is inhibiting the activity of the soluble adenylyl cyclase.

174. (New) The method according to claim 171, wherein the eukaryotic cell is a mammalian cell.

175. (New) The method of claim 174, wherein the mammalian cell is a human cell.